

CLAIMS

What is claimed is:

- 1 1. A low noise amplifier redundancy system comprising:
 - 2 an antenna receiving a received signal;
 - 3 at least two low noise amplifiers (LNAs), each low noise amplifier comprising
 - 4 a low noise amplifier input that receives the received signal and a low noise amplifier
 - 5 output;
 - 6 an switch having an input connected to the received signal, and at least two
 - 7 outputs, each output connected to a separate low noise amplifier input;
 - 8 a controller that controls the switch and the low noise amplifiers to select one
 - 9 of the low noise amplifiers, such that the received signal is amplified by only one of
 - 10 the low noise amplifiers; and
 - 11 a combiner connecting the outputs of the low noise amplifiers to a single
 - 12 signal line.
- 1 2. A redundant receiving system comprising:
 - 2 a plurality of receiving chains, each comprising
 - 3 a received signal;
 - 4 a splitter having two outputs with each outputting the same received
 - 5 input signal;
 - 6 a down converter connected to one output of the splitter; and
 - 7 an upstream receiver connected to the down converter;
 - 8 a redundancy switch having a plurality of inputs, each input connected to a
 - 9 splitter output from each receiving chain;
 - 10 a back-up down converter connected to an output of the redundancy switch;
 - 11 a back-up upstream receiver connected to the back-up down converter; and

12 a first controller connected to the redundancy switch to select one of the
13 outputs from the plurality of splitters.

1 3. The system of Claim 2, wherein each receiving chain further comprises:
2 an amplifier switch having an input connected to the received signal, and two
3 outputs;
4 two low noise amplifiers (LNAs), each low noise amplifier having an input
5 connected to one output of the amplifier switch;
6 a second controller connected to control the amplifier switch and the low noise
7 amplifiers, such that the received signal is amplified by only one of the low noise
8 amplifiers; and
9 a combiner connecting the outputs of the low noise amplifiers to the splitter.

1 4. The system of Claim 3, wherein each receiving chain further comprises a
2 band-pass filter connected between the antenna and the switch.

1 5. A method for providing redundancy in a wireless hub, comprising:
2 receiving a plurality of upstream signals;
3 amplifying each upstream signal with a separate low noise amplifier;
4 down converting the output of each of the low noise amplifier by utilizing a
5 separate down converter;
6 receiving a down converted signal from each down converter with a separate
7 receiver;
8 providing a data signal from a receiver; and
9 when no data signal is provided by one of the receivers, selecting an alternate
10 low noise amplifier to amplify the associated upstream signal.

1 6. The method of Claim 5, further comprising when no data signal is provided
2 by one of the receivers after selecting an alternate low noise amplifier, providing the

3 output of the low noise amplifier associated with the receiver to a redundant down
4 converter, the redundant down converter providing a redundant down converted signal
5 to a redundant receiver.

1 7. A method for providing redundancy in a wireless hub, comprising:
2 receiving a plurality of upstream signals;
3 amplifying each upstream signal with a separate low noise amplifier;
4 down converting the output of each of the low noise amplifier by utilizing a
5 separate down converter;
6 receiving a down converted signal from each down converter with a separate
7 receiver;
8 providing a data signal from a receiver; and
9 when no data signal is provided by one of the receivers, providing the output
10 of the low noise amplifier associated with the receiver to a redundant down converter,
11 the redundant down converter providing a redundant down converted signal to a
12 redundant receiver.

1 8. A low penetration receiving system comprising:
2 a plurality of low noise amplifiers;
3 a switch having a plurality of inputs, each input connected to one low noise
4 amplifier;
5 a down converter connected to an output of the switch; and
6 an upstream receiver connected to the down converter;
7 wherein the down converter and receiver are time shared between signals
8 produced by each low noise amplifier.

1 9. A low penetration receiving system with redundancy comprising:

a plurality of low noise amplifiers, each amplifier amplifying an upstream signal;

a plurality of splitters, each splitter connected to an amplifier and having a first output and a second output;

a first switch having a plurality of inputs, each input connected to a distinct one of the first outputs of the plurality of splitters;

a second switch having a plurality of inputs, each input connected to a distinct one of the second outputs of the plurality of splitters;

a first down converter connected to an output of the first switch;

a first upstream receiver connected to the first down converter;

a second down converter connected to an output of the second switch;

and

a second receiver connected to the second downconverter.

10. The system of Claim 9, further comprising a plurality of secondary low noise amplifiers, wherein one secondary low noise amplifier is connected in parallel to one of the plurality of low noise amplifiers.

11. A method for low penetration redundancy, the method comprising:

receiving a plurality of upstream signals;

amplifying each upstream signal with a separate low noise amplifier;

splitting each amplified signal into two signals;

down converting the output of each of the low noise amplifier with a single down converter;

receiving a down converted signal from the down converter with a single receiver;

time sharing the down converter and receiver during a low penetration period;

10 providing a data signal from the receiver; and
11 when no data signal is provided by the receiver when receiving a signal from
12 one of the low noise amplifiers, providing the output of the low noise amplifier to a
13 redundant down converter, the redundant down converter providing a redundant down
14 converted signal to a redundant receiver.